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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,043	08/19/2004	Shaun Crawford	BUR920040095US1	5042
44152	7590	06/29/2007		
GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARK DRIVE RESTON, VA 20191			EXAMINER KEBEDE, BROOK	
			ART UNIT 2823	PAPER NUMBER
			NOTIFICATION DATE 06/29/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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TH

<b>Office Action Summary</b>	<b>Application No.</b> 10/711,043	<b>Applicant(s)</b> CRAWFORD ET AL.	
	<b>Examiner</b> Brook Kebede	<b>Art Unit</b> 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-13 and 21-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,9-13 and 21-23 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Continued Examination Under 37 CFR 1.114*

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on June 8, 2007 has been entered.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. **Claims 2-6, 9-13 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over (US 6,291,360) in view of Kudo et al. (JP 63216346).**

Re claim 2, Moon discloses a method of photoresist trimming, comprising the steps of: arranging an opaque layer (23) (i.e., amorphous silicon layer that non-transparent) on a substrate (21); arranging a photoresist layer (25) on the opaque layer (23); developing the photoresist layer (25) to form a trench (not labeled) in the photoresist layer (see Fig. 2A), wherein the trench comprises a sidewall having a resist foot (27) (see Fig. 2A); mixing a trimming gas comprising  $O_2$  and  $SF_6$ ; and applying the trimming gas comprising  $O_2$  and  $SF_6$  to selectively remove the resist foot (27), such that the sidewall is substantially perpendicular to an upper surface of the opaque layer after the applying (see Figs. 2A-2C; 3A-3B and related text in Col. 2, line 52 – Col. 4, line 30).

Although it is known to use an ashing gases mixture comprises  $O_2$  and  $NO_2$  or  $O_2$  and  $SO_2$  or  $O_2$  and  $CO_2$  to remove the photoresist layer, Moon does not disclose the second gas being  $NO_2$ ,  $SO_2$  or  $CO_2$ .

Kudo et al. disclose a  $NO_2$  gas in addition to  $O_2$  gas into electron cyclotron resonance plasma chamber and to decompose the gas mixture into plasma in order to remove photoresist layer that formed on the substrate (see English Abstract).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to provide Moon reference with a plasma generated by a gas mixture of  $O_2$  and  $NO_2$  as taught by Kudo et al. in order to remove photoresist layer.

Re claim 3, as applied to claim 2 above, Moon and Kudo et al. discloses all the claimed limitations including wherein the mixing and the applying comprises a plasma etching process (see Moon Figs. 2A-2C; 3A-3B and related text in Col. 2, line 52 – Col. 4, line 30 and Kudo English Abstract).

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Re claim 4, as applied to claim 2 above, Moon and Kudo et al. in combination disclose all the claimed limitations including wherein an upper surface of the mask-photoresist layer is resistant to etching (see Moon Figs. 2A-2C; 3A-3B and related text in Col. 2, line 52 – Col. 4, line 30 and Kudo English Abstract).

Re claim 5, as applied to claim 4 above, Moon and Kudo et al. disclose all the claimed limitations including polymerizing an upper surface of the photoresist layer (see Moon Figs. 2A-2C; 3A-3B and related text in Col. 2, line 52 – Col. 4, line 30 and Kudo English Abstract).

Re claim 6, as applied to claim 3 above, Moon and Kudo et al. disclose all the claimed limitations including providing a barrier on an upper surface of the photoresist derived from an oxide gas (see Moon Figs. 2A-2C; 3A-3B and related text in Col. 2, line 52 – Col. 4, line 30 and Kudo English Abstract).

Re claims 9-13, as applied to claim 2 above, Moon and Kudo et al. in combination disclose all the claimed limitations except the ratio of the gas mixtures and desired pressure of the gas mixtures. Although, Hamada et al. disclose the gas mixtures and at predetermined pressure that used for trimming or the resist layer, the value or various ratios of the gas mixtures and the pressure ranges are not specifically mentioned. However, the ratios of the gas mixtures and the pressure ranges as claimed in the instant application is obvious in view of Hamada et al. disclose because such ratios and pressure ranges can be achieved by routine experimentations in order to achieve the desired etch rate and profile.

Therefore, it would have been to one having ordinary skill in the art at the time of the invention is made to set the gas mixture ratio and pressure range, since it has been held where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the

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optimum or workable ranges by routine experimentation.” See *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990); and *In re Geisler*, 116 F.3d 1465, 43 USPQ2d 1362 (Fed. Cir. 1997). Furthermore, the specification contains no disclosure of either the critical nature of the claimed gas mixture ratio and pressure range or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. See *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1936 (Fed. Cir. 1990).

Re claim 21, as applied to claim 2 above, Moon and Kudo et al. in combination disclose all the claimed limitations including wherein the applying forms a hardened layer of the photoresist layer (see Moon Figs. 2A-2C; 3A-3B and related text in Col. 2, line 52 – Col. 4, line 30 and Kudo English Abstract).

Re claim 22, as applied to claim 2 above, Moon and Kudo et al. in combination disclose all the claimed limitations including polymerizing an upper layer of the photoresist layer (see Moon Figs. 2A-2C; 3A-3B and related text in Col. 2, line 52 – Col. 4, line 30 and Kudo English Abstract).

Re claim 23, as applied to claim 22 above, Moon and Kudo et al. in combination disclose all the claimed limitations including wherein the applying the trimming gas causes the polymerizing (see Moon Figs. 2A-2C; 3A-3B and related text in Col. 2, line 52 – Col. 4, line 30 and Kudo English Abstract).

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***Allowable Subject Matter***

4. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

5. Applicant's arguments with respect to claims 1-6, 9-13, and 21-23 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

6. **THIS ACTION IS MADE NON-FINAL.**

***Correspondence***

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (571) 272-1862. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brook Kebede/  
Primary Examiner, Art Unit 2823

/BK/  
June 23, 2007